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10/530,733	02/21/2006	Stefano Barbieri	M0025.0325/P325	2090

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EXAMINER

GOLUB-MILLER, MARCIA A

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2828

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed on 8/20/10 with respect to claim 1 have been considered but they are not persuasive.

Regarding applicant's argument that "Barbieri et al. cannot be prior art because it is not "by others", the examiner disagrees and points out that "by others" means "different inventive entity". Present application has two inventors while Barbieri et al. has eleven inventors. Therefore, the inventors listed in Barbieri et al. cannot be considered to be the same inventive entity as the current applicants.

Regarding applicant's argument that "the contacts in Hwang are both above the active region and are thus not disposed on opposite sides of the active region" the examiner points out that when viewed from the side in Fig 1 it is apparent that the contacts are disposed above the current constricting regions that surround the active region [105] on opposite sides, therefore the contacts are placed on opposite sides of the active region.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-4 and 7-12 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Barbieri et al. ("Continuous Wave Terahertz Quantum Cascade Laser" found in IDS).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohler et al. (Terahertz Quantum Cascade Lasers, found in IDS) hereinafter IDS1 and further in view of Hwang (6,560,259) hereinafter '259.

Fig. 2a of IDS1 discloses a laser comprising:

1. "a substrate comprising a bulk region [Si substrate] and a conducting layer [bottom contact layer];

an active region [active trapezoidal ridge] comprising a quantum cascade structure [Fig 1a] provided on a first surface of the substrate such that said active region is electrically connected to said conducting layer,

the active layer having a thickness selected such that the energy spacing of sub bands formed by the layers causes the active region to lase; (see section B on page 3)

said active region forming a strip on said first surface of the substrate, said strip having cleaved facets at each end; (see 1st paragraph of section IV)

first contact [side contact] provided to said conducting layer such that said first contacts is electrically connected to said active region, and

an active region contact [top contact] provided to said active region such that a potential may be applied between said active region contact and said first contact to cause said active region to lase, wherein said potential is applied in parallel to said conducting layer by first contact,

said active region contact being metal contact provided overlying said active region on a surface parallel to said first surface of the substrate and wherein emission from said laser is collected from one of the cleaved facets of said active region." (see

1st paragraph of section IV)

IDS1 does not disclose:

A second contact, "said first and second contacts being disposed on opposite sides of said active region" to provide a potential in parallel.

However, making symmetrical contacts on both sides of the active region is well known in the art, as evidenced by Fig 5 of '259. Also, applicant has not disclosed that adding a second contact solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with or without the second contact.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '259 into the device of 'IDS1 by making a second contact layer on the opposite side of the ridge waveguide for at least the purpose of injecting the current symmetrically into the active layer.

2. "wherein the conducting layer [109] comprises a highly doped semiconductor."
($2 \times 10^{18} \text{ cm}^{-3}$)

3. "wherein the conducting layer is thin enough [800 nm], such that in operation, the two surface plasmons present at the two interfaces of the conducting layer merge into a single mode." (see section B on page 3)

4. " wherein the cascade laser is configured to emit photons having a frequency in the range from 0.02 THz to 100 THz." 4.4 THz

9. "wherein said first and second contacts are symmetric about said active region."

7,8. "wherein the resistance between the first and active region contacts or second and active region contacts is less than twice the resistance of the active region." No actual structure is recited that would differentiate the invention from the prior art in making the resistance between the contacts less than twice the resistance of the active layer. Also, it is not clear at what operational voltage/current the resistance is measured.

10. "wherein the dielectric constant of the conducting layer is negative relative to the dielectric constant of the surrounding layers." (see section B on page 3)

11. "wherein the active region comprises a strip waveguide with a trapezoidal cross section."

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12. “wherein the active region comprises a lamination of layers [AlGaAs/GaAs] having at least two different band gaps.”

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB-MILLER whose telephone number is (571)272-8602. The examiner can normally be reached on M-Th 9:30-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Marcia A Golub-Miller/
Art Unit 2828

/Minsun Harvey/
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